

**REMARKS**

Claims 1, 4-7, and 10-15 have been amended. Claims 1-15 are all the claims pending in the application.

***Formal matters***

Applicant notes that the Examiner has not indicated the status of the drawings, and respectfully requests the Examiner to accept the drawings filed on September 2, 2003.

The Examiner has also not acknowledged claim to foreign priority or receipt of a certified copy of the priority document, which was submitted on September 2, 2003. Applicant thus respectfully requests the Examiner to acknowledge claim to foreign priority and receipt of a certified copy of the priority document in the next Office Action.

On April 10, 2006, Applicant submitted an information disclosure statement. Applicant respectfully requests the Examiner to give required consideration to the documents therein in the next Office Action.

***Claim rejections -- 35 U.S.C. § 101***

Claims 13-15 stand rejected under 35 U.S.C. § 101 as allegedly being directed to non-statutory subject matter. Applicant has amended the claims, and respectfully requests the Examiner to withdraw the rejection.

*Claim rejections – 35 U.S.C. § 103*

Claims 1-15 stand rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over U.S. Patent No. 5,959,860 to Styczinski in view of U.S. Patent NO. 6,341,356 to Johnson.

Applicant respectfully traverses this rejection.

In making the rejection, the Examiner contends that one having skill in the art would have been motivated to combine the teachings of Styczinski and Johnson because multiple paths provide redundancy, which would allow the system to decrease the possibility of losing data in a particular storage device and cites to Johnson at cols. 1:65-2:2 for this proposition. However, Applicant submits that when the whole of the teachings of both references are considered, one having skill in the art would not have been motivated to combine the teachings of Styczinski and Johnson.

Styczinski is directed to a method and apparatus for operating an array of storage devices, i.e. a RAID. Such devices use parity records in order to provide data redundancy. A parity record is stored on each individual disk drive and, upon loss of data on one drive, the data may be recovered by XORing the parity table with the faulty data. However, a problem occurs with this method of data redundancy in that overhead associated with producing the parity information for each write becomes large as the amount of data increases. A CPU typically runs much faster than the storage devices. Thus, the CPU must wait while data is first written to the disk and then the parity information is produced. This slows down the CPU, which could be doing other things. Styczinski thus proposes to use a write assist disk unit. Data is first written

to the write assist disk unit without parity information being produced. Then, the write assist disk unit, which is under its own control, writes to the disk drives in the RAID with parity information, thus freeing up the CPU. It is also noted that the disk drives of Styczinski are organized into stripes, with one stripe consisting of sections of each of the disk drives.

By contrast, Johnson proposes a system including multiple paths to each of several disk drives. When one path fails, the other paths to the same disk drive is tried, thus providing redundancy. The management of the multiple paths is performed by path management code, which interacts with an interface, a device driver, SCSI adapters and disk drives in order to implement the system.

One having skill in the art would not look to combine these two teachings for two reasons. First, the heart of Styczinski's system is the write assist disk (WAD) unit. While the WAD unit is working, the CPU always writes directly to the WAD unit, thus freeing up the CPU. To implement a plural path arrangement suggested by Johnson would thus tie up the CPU with the increased overhead of the path management system. This would hinder the goals of Styczinski to provide fast, efficient writing to the RAID. Second, when one of the individual disk units fails, the WAD unit is switched over to replace the failed unit. In other words, the WAD unit ceases to function as a write assist, and takes over the more permanent storage function. Thus, to implement the plural path arrangement suggest by Johnson between the WAD and the other disks would also frustrate the purposes of Styczinski because the WAD unit is not always acting as a controller for the remaining disks. Third, even if the multiple path arrangement of Johnson could be theoretically implemented in Styczinski, such implementation

would change the principle of operation of Styczinski, which uses parity information in order to provide data redundancy. Therefore, for at least the above reasons, one having skill in the art would not be motivated to combine Styczinski and Johnson.

Even assuming, *arguendo*, that Styczinski and Johnson may be combined, the combination still does not teach or suggest every feature of the claims. For example, claim 1 recites, *inter alia*, the limitation that when a fault of one of the storage devices occurs, a disk management mechanism inputs physical position information of the failed storage device and operation contents of the failed storage device to instruct the disk multiplexing mechanism on restoration operation. The Examiner maintains that this limitation is met by Styczinski at col. 12, lines 1-12. However, Applicant respectfully disagrees.

At col. 12, lines 1-12 of Styczinski, Styczinski describes steps which occur with respect to the WAD unit in the event of a failure of one of the service units. First, the write assist function (i.e. use of the WAD unit) is deactivated. Second, the controller completes any (already started) writing of incomplete write operations in the WAD unit's uncommitted list to the service units. Third, storage space is reassigned from the failed service unit to the WAD unit. The Examiner will appreciate that these steps describe operations taken with respect to the working WAD unit, and not with respect to the failed service unit. Thus, Styczinski does not disclose inputting physical position information of the failed storage device or operation contents of the failed storage device, as required by claim 1. Johnson does not cure the deficiency of Styczinski. Claim 1 therefore is patentable over the Styczinski and Johnson combination.

Independent claims 7 and 13 each recite a limitation similar to that discussed above with respect to independent claim 1. Therefore, independent claims 7 and 13 are patentable for the same reasons discussed above with respect to the patentability of claim 1.

The remaining claims are patentable based on their dependencies.

***Conclusion***

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.

Respectfully submitted,



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